



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2005IA81B

Title: Sensors for CyberEngineering: Monitoring and Modeling the Iowa River for Nutrients and Sediments

Project Type: Research

Focus Categories: Nutrients, Sediments, Water Quality

Keywords: water quality, monitoring, nutrients, eutrophication, sensors

Start Date: 03/01/2005

End Date: 02/28/2006

Federal Funds: \$17,624

Non-Federal Matching Funds: \$37,130

Congressional District: IA 1st

Principal Investigator:

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Abstract

Excessive addition of nutrients to Iowa surface waters from nonpoint and point sources impairs our waters for beneficial uses, and it also affects down-stream users. Gulf Hypoxia, eutrophication, harmful algal blooms, and impairment of aquatic life are just some of the problems related to runoff of nutrients and sediments into Iowa waterways. To date, we do not have cost-effective ways to monitor all of the State's waters and to develop Total Maximum Daily Loads (TMDLs). Also, we do not make effective use of modern sensing and computer technologies to improve our environmental cyberinfrastructure. Recent improvements in such technologies, data mining, and genetic algorithms allow radical improvements in our abilities for real-time sensing of the environment, analysis of the problems, and for evaluation of Best Management Practices or other policy decisions involved with water quality management plans under the TMDL process.

The objective of this research is to gain experience with environmental cyberinfrastructure for sensing, modeling, and analyzing nutrient and sediment problems. We will purchase an initial backbone of sensors, data nodes, and access nodes for real-time measurement of gage height, velocity, dissolved oxygen, temperature, conductivity,

salinity, pH, turbidity, nitrite, and nitrate. Data will be accessed, stored, and used as input for exercising water quality models (QUAL-2EU and HSPF) in a real-time environment.